

## AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

### LISTING OF CLAIMS:

1. (currently amended) A method for detecting a binding event between at least one binder and members of a receptor array, comprising the steps of:
  - (a) exposing a plurality of receptors to at least one potential binder being detectable by X-ray fluorescence;
  - (b) arraying the receptors onto a substrate;
  - (c) exposing each member of the array that has already been exposed to at least one potential binder to X-ray radiation to induce an X-ray fluorescence signal from each member of the array now bound to at least one binder, thereby indicating that a binding event has occurred; and
  - (d) detecting an X-ray fluorescence signal resulting from exposure to the X-ray radiation from any member of the array where a binding event has occurred.
2. (original) The method of claim 1, wherein the receptor comprises at least one organic compound.
3. (original) The method of claim 1, wherein the receptor comprises at least one oligomer.
4. (original) The method of claim 1, wherein the receptor comprises at least one polymer.
5. (original) The method of claim 1, wherein the receptor is selected from the group consisting of esters, amines, imines, aldehydes, ketones, amides, ethers, olefins, halogenated organic molecules, antibodies, drugs, steroids, amino acids, nucleic acids, oligomers, oligonucleotides, oligosaccharides, oligopeptides, polyolefins, polyurethanes, polyesters, polycarbonates, polyamines, polyamides, halogenated polymers, polypeptides, polynucleotides, polysaccharides, nucleic acids, cell membrane receptors, viruses, cells, cellular membranes, and organelles.

6. (original) The method of claim 1, wherein the binder comprises at least one organic molecule.

7. (original) The method of claim 1, wherein the binder comprises at least one oligomer.

8. (original) The method of claim 1, wherein the binder comprises at least one polymer.

9. (original) The method of claim 1, wherein the binder comprises at least one metal ion.

10. (original) The method of claim 4, wherein the binder is selected from the group consisting of esters, amines, imines, aldehydes, ketones, amides, ethers, olefins, halogenated organic molecules, antibodies, drugs, hormones, steroids, amino acids, nucleic acids, oligomers, oligonucleotides, oligosaccharides, oligopeptides, polyolefins, polyurethanes, polyesters, polycarbonates, polyamines, polyamides, halogenated polymers, polypeptides, polynucleotides, polysaccharides, nucleic acids, metal ions, anions, complex ions, oxoanions, polyoxoanions, phosphate, organophosphates, sulfate, organosulfates, zirconate, agonists and antagonists for cell membrane receptors, toxins, enzymes, enzyme substrates, cofactors, and antibodies.

11. (previously presented) A method for detecting chemical binding between at least one binder and members of a receptor array, comprising the steps of:

(a) exposing a plurality of receptors to at least one potential binder wherein the at least one potential binder is not labeled with an additional optically fluorescent tag;

(b) arraying the receptors onto a substrate;

(c) thereafter exposing each member of the array that has already been exposed to at least one potential binder to X-ray radiation to induce an X-ray fluorescence signal from each member of the array now bound to at least one binder, thereby indicating that a binding event has occurred; and

(d) detecting an X-ray fluorescence signal resulting from exposure to the X-ray radiation from any member of the array where a binding event has occurred.

12. (previously presented) The method of claim 11, wherein the receptor comprises at least one organic compound.

13. (previously presented) The method of claim 11, wherein the receptor comprises at least one oligomer.

14. (previously presented) The method of claim 11, wherein the receptor comprises at least one polymer.

15. (previously presented) The method of claim 11, wherein the receptor is selected from the group consisting of esters, amines, imines, aldehydes, ketones, amides, ethers, olefins, halogenated organic molecules, antibodies, drugs, steroids, amino acids, nucleic acids, oligomers, oligonucleotides, oligosaccharides, oligopeptides, polyolefins, polyurethanes, polyesters, polycarbonates, polyamines, polyamides, halogenated polymers, polypeptides, polynucleotides, polysaccharides, nucleic acids, cell membrane receptors, viruses, cells, cellular membranes, and organelles.

16. (previously presented) The method of claim 11, wherein the binder comprises at least one organic molecule.

17. (previously presented) The method of claim 11, wherein the binder comprises at least one oligomer.

18. (previously presented) The method of claim 11, wherein the binder comprises at least one polymer.

19. (previously presented) The method of claim 11, wherein the binder comprises at least one metal ion.

20. (previously presented) The method of claim 11, wherein the binder is selected from the group consisting of esters, amines, imines, aldehydes, ketones, amides, ethers, olefins, halogenated organic molecules, antibodies, drugs, hormones, steroids, amino acids, nucleic acids, oligomers, oligonucleotides, oligosaccharides, oligopeptides, polyolefins, polyurethanes, polyesters, polycarbonates, polyamines, polyamides, halogenated polymers, polypeptides, polynucleotides, polysaccharides, nucleic acids, metal ions, anions, complex ions, oxoanions, polyoxoanions, phosphate, organophosphates, sulfate, organosulfates, zirconate, agonists and antagonists for cell membrane receptors, toxins, enzymes, enzyme substrates, cofactors, and antibodies.